1. PROVIDE EITHER HAND OR MOTOR OPERATED VALVES AS PER SERVICE HEADQUARTERS, PROJECT PROGRAMMING AND SCOPING DOCUMENTS FOR PIERS WHICH DISPENSE FUEL AS FREQUENTLY AS RECEIVING FUEL, USE MOTOR OPERATED VALVES IN PLACE OF HAND OPERATED VALVES IN MAIN LINES.

2. PROVIDE PIPE SUPPORTS, ANCHORS AND GUIDES IN ACCORDANCE WITH UFC 3-460-01.

3. PROVIDE BASKET STRAINER WITH DP GAUGE, DRAIN AND SUPPORT FEET.

4. DESIGN PRESSURE RELIEF PIPE AROUND ISOLATION VALVES AS TO NOT INTERFERE WITH WALKWAY.
1. Manual quick couplings allow assembly and loading arms illustrated are representative of one manufacturer and are not intended to restrict products of other manufacturers which may also be considered.

2. Loading arm flare connection shall be completely isolated from pier and terminal. The area requires insulating joints in hydraulic tubing where used or if required, an insulating flange at the end of loading arm.

3. In shift current, provide an emergency break away coupling at the loading arm flare.

4. Ensure the mains loading arm is located and not interfere with items that jut out from the vessel and pier or vessels when on the pier. The loading arm should be at least 0.6 m (2 ft) from the edge of the vessel to allow for clearance of the vessel when connected. The location shall prevent the loading arm from interfering with any possible clearance issues.

5. For life safety, the MLA shall be located so that the connected vessel can move in the fluid piping. The location shall provide at least 0.6 m (2 ft) of clearance on the side of the vessel when connected and close to the pier. The location should be such that the vessel can be moved away from the MLA without any interference with any possible clearance issues.

6. Ensure that the type of oil that is used in the MLA is directly available in the United States or the location where the MLA is installed.

7. Enter general information and the system and the connected system. If the MLA is left unattended for extended periods, care shall be taken to ensure that the MLA is not damaged. Do not assume that additional bumpers will be used to protect the MLA.

8. ENSURE THE BROW LOCATION DOES NOT INTERFERE WITH EQUIPMENT FROM THE VESSEL. ENSURE THERE IS A VENT PULL LINE AVAILABLE FROM BOTH THE SHORE-SIDE AND THE SHIP-SIDE. IF THE MLA IS TO BE EMPTIED AFTER BEING INSTALLED, THEN THE MLA IS TO BE LOCATED SO THAT THE CONNECTED VESSEL CAN BE DRAINED OF PRODUCT AFTER IT IS DISCONNECTED FROM THE EXISTING KAISER CLASS VESSEL, BUT WITHOUT THE HOSE RACK BEING INSTALLED. THE SPACING ON THE NEW LEWIS CLASS VESSEL IS ABOUT THE SAME AS THE EXISTING KAISER CLASS VESSEL, BUT WITHOUT THE HOSE RACK INTERFERENCE WITH ANY POSSIBLE CLEARANCE ISSUES.


10. FOR FUEL PIER: Provide insulation flanges, type DBB valve, type line blind valve, type hydraulic tubing conduit shall be considered.

11. FUEL PIER: Provide insulation flanges, type DBB valve, type line blind valve, type hydraulic tubing conduit shall be considered.

12. Provide color coding for shore-to-ship utility connections in accordance with UFC-4-150-02.

13. Have less control, if proved useful, we consider it closer to 0.6 m (2 ft) for safety, keeping in mind that the MLA is connected with the activity requirements and for use with coated piping and with UFAC 4-010-06 for cyber security requirements.
MARINE LOADING ARM (MLA) DEPICTED HAS A WIRE ROPE/SHEAVE MOVEMENT ASSEMBLY. OTHER MOVEMENT ASSEMBLIES, SUCH AS A PANTOGRAPH, ARE AVAILABLE. DESIGNER TO INVESTIGATE AND PROVIDE THE BEST MLA FOR THE PROJECT.
NOTES:
1. PROVIDE BACKFLOW PREVENTER IF FIRE WATER SYSTEM IS PART OF THE POTABLE WATER SYSTEM.
2. PROVIDE FIRE PROTECTION IAW AUTHORITY HAVING JURISDICTION, UFC 3-460-01, UFC-4-152-01, UFC 4-150-02, UFC 4-150-06, NFPA 30, NFPA 307 AND "GUIDE ON MARINE TERMINAL FIRE PROTECTION AND EMERGENCY EVACUATION".
3. PROVIDE PROPER FIRE PROTECTION SYSTEMS FOR CLASS I LIQUIDS.

M-501
**DESIGNER NOTES:**

1. The pipe support web attachment to the pipe shall be the same material as the pipe in which it is installed.

**LIMITED FIT U-BOLT INSTALLATION**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**LOOSE FIT U-BOLT INSTALLATION**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**PIPE SUPPORT TYPE FS: FREE SUPPORT**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**PIPE SUPPORT TYPE GS: GUIDED SUPPORT**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**LESS THAN 8" DIA PIPE SUPPORT TYPE AS: ANCHORED SUPPORT**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**8" DIA OR GREATER PIPE SUPPORT TYPE AS: ANCHORED SUPPORT**

- Top of support steel or base plate
- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**PIPE SUPPORT DETAILS**

- Pipe Field Weld to Steel Tee
- 2.10"
- 2.10"
- 1/8" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout

**SCALE:**

- NONE

**LIMITED FIT U-BOLT INSTALLATION**

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- Stainless steel facing on tee
- Filled Teflon on top surface of steel plate
- Pipe field weld to steel tee
- With 10" long
- 1/4" (4)-7/8" Dia A307 Anchor Rods or Shim or Leveling Nut as req'd.
- Non-metalllic, non-shrink grout
NOTE 4.
SEE DESIGNER STRIPPER BLDG PUMPS

NOTE 4.
SEE DESIGNER NOTE 3.

LOCATION:
CATHODIC PROTECTION ANODE LOCATED ON PROTECTION RECTIFIER CONDITION．SEE DESIGNER NOTE 3.

CONNECT CATHODIC PROTECTION CABLE TO BREASTING DOLPHIN (ROUTE CABLE TO FENDER SYSTEM AND PILES, LEAVE SUFFICIENT SLACK TO ABSORB VIBRATIONS.

FUEL TRANSFER ARM

CLASS I, DIVISION 1, GROUP D AREA TO HEIGHT OF 3'-0" ABOVE DECK.

FOR ALL BENTS): ROUTE TO SERVICE POINT SHORE LINE.

TYPICAL CONNECTION
FUEL TRANSFER ARM

CLASS I, DIVISION 2, GROUP D AREA TO HEIGHT OF 18" ABOVE DECK.

ALL AREAS BELOW PIER DECK WHERE SPILLED HAZARDOUS MATERIAL IS LIKELY TO COLLECT (SUMPS, TRENCHES, ETC.) ARE CLASS I, OTHER FUELING PIER AREA ARE CLASS I, DIVISION 2, GROUP D AREA

PROVIDE NAVIGATION LIGHTS ON PIER PER COAST GUARD REGULATIONS.

FLOODLIGHT POLES SHALL BE LOCATED SO THAT THERE IS NO INTERFERENCE WITH THE FUEL TRANSFER OPERATIONS.

FUEL PIER GROUNDING PLAN

PROVIDE GROUND CABLE FROM $G$ WITH NON-ARCHING WELDING TYPE CONNECTOR, FOR REMOVAL AND STORAGE OF CABLE.

EXPANSION JOINT FITTING.

USE BARE COPPER BONDING JUMPER ACROSS EACH CONDUIT EXPANSION JOINT INSIDE THE BARGE FENDER SYSTEM, BARGE STOP (ROUTE CABLE FROM BOTTOM OF PIER TO PIER TOP), WALKWAYS) AND CONNECT TO GROUND LOOP WITH #I/O HMWPE CABLE. REFER TO PLAN 3/S-101.

PROVIDE ELECTRICAL GROUND AND BONDING IN ACCORDANCE WITH NFPA 70, 77 AND 78. BOND ALL PIPING, FLOODLIGHT POLES, RECEPTACLES, ELECTRICAL POWER AND LIGHTING PANEL BOARDS AND DRY TYPE TRANSFORMERS SHALL BE INSTALLED AT A HEIGHT TO SUIT LOCAL CONDITIONS.

EXPLOSION-PROOF LED TYPE WITH CAST ALUMINUM HOUSING, A MINIMUM OF 8,000 DELIVERED LUMENS AND 5000K COLOR TEMPERATURE.

FUEL TRANSFER OPERATIONS AVERAGE MAINTAINED LEVEL AT THE FUEL TRANSFER CONNECTION POINTS ON FACILITY AND BARGE, ETC.

ILLUMINATION LEVELS (FLOOD LIGHTING):

5 FOOTCANDLES AVERAGE MAINTAINED LEVEL AT FUEL TRANSFER CONNECTION POINTS ON FACILITY AND BARGE, ETC.

1 FOOTCANDLE AVERAGE MAINTAINED LEVEL ON ACCESS AREAS MAINTAINED PERIODICALLY BY PERSONNEL PEP AREAS AROUND THE DECK.
SYMBOL
$G-30AMP DISCONNECT SWITCH LOCATE NEXT TO THE ELECTRICAL RECEPTACLE CENTERS.

25'-0" OF 2/C, #1/O, TYPE "SQ" FLEXIBLE CORD WITH 8" "C" CLAMP EXOTHERMICALLY WELDED TO BOTH CONDUCTORS.

1/C, #1/O SOFT DRAWN BARE STRANDED COPPER WIRE IN 3/4" PVC COATED (40 MIL) RIGID STEEL CONDUIT WITH GROUNDING BUSHING. CONNECT BUSHING TO GROUND LOOP WITH BARE STRANDED COPPER JUMPER.

CURB OF PIER

1/C, #1/O SOFT DRAWN BARE STRANDED COPPER WIRE GROUND LOOP. REFER TO UFGS 26 05 26.00 40 "GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS" FOR GROUNDING AND ISOLATION REQUIREMENTS.

1/C, #1/O SOFT DRAWN BARE STRANDED COPPER WIRE EXOTHERMICALLY WELDED TO GROUND LOOP AND ROD. INSTALL STAINLESS STEEL SUPPORT STRAPS AT 2' INTERVALS (TYP).

WATER SURFACE

MUD LINE

FIRM SOIL LINE

GROUND ROD. LENGTH VARIES. DRIVE POINT 15'-0" INTO FIRM SOIL. INSTALL STAINLESS STEEL SUPPORT STRAPS AT 2'-0" INTERVALS (TYP).